

Comment

Optimizing patient education for sustainable self-management in type 2 diabetes

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Abstract

Type 2 diabetes mellitus (T2DM) is a prevalent global health challenge, affecting millions and imposing significant economic and societal burdens. Effective self-management of this chronic condition hinges on patient education, which equips individuals with the knowledge and skills necessary to manage their disease and prevent complications. However, current patient education models face limitations in fostering behavioral change, addressing psychological challenges, and meeting diverse patient needs. This commentary examines the efficacy of existing educational frameworks, highlighting their focus on medical management while often overlooking emotional and social aspects of care. Emerging trends, including digital health tools and shared decision-making approaches, offer promising avenues for personalized, patient-centered education. The integration of these advancements with traditional models could improve patient engagement, enhance glycemic control, and promote better quality of life. A reimagined patient education paradigm—responsive to cultural, literacy, and technological barriers—may bridge existing gaps and empower individuals for sustained diabetes self-care. A comprehensive evaluation of peer-reviewed studies from reputable scientific databases, including Web of Science and Scopus, was conducted. Studies that evaluated the effectiveness of existing patient education models in managing Type 2 diabetes mellitus were focused on. Studies that highlighted the impact of patient education on self-management, behavioural change, and glycaemic control were selected. The results and synthesised findings were thoroughly analysed to propose a reimagined, patient-centred education paradigm that addresses gaps and fosters sustainable self-care practices.

Keywords Type 2 diabetes mellitus · Patient education · Diabetes self-management · Behavioral change · Glycemic control · Health literacy

Type 2 diabetes mellitus is one of the most prevalent non-communicable diseases globally, affecting almost 530 million individuals in 2021 alone [1]. Experts predict that this number will rise to 643 million by 2030 [2]. Moreover, the condition exacerbates morbidity and death by increasing the occurrence of cardiovascular illnesses, renal failure, nerve damage, and eye impairment, among other consequences [3]. The economic impact of diabetes remains a significant challenge for health care systems, individual patients, and society at large. The current statistics for 2021 indicate that the worldwide treatment cost for diabetes amounts to \$966 billion. Over the past 15 years, this cost has increased by 316% [4]. Other outcomes that reflect the disease's effects include decreased productivity and premature death. Several contributing factors, including obesity, minimal or no physical activity, inadequate dietary practices, and individual ageing, are responsible for the increase [5]. Furthermore, it is unfortunate that death due to diabetes is far higher in low- and

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middle-income countries. Patients in low- and middle-income countries face challenges in accessing sufficient health-care, education, and drugs, which is believed to have contributed to an increased mortality rate [6]. Given the growing difficulty, it is imperative to prioritise initiatives that concentrate on the prevention and early detection of this disease. Additionally, it is necessary to enhance therapeutic methods in order to minimise the likelihood of complications and thereby reduce the overall cost of healthcare.

The prevalence of type 2 diabetes continues to exert significant strain on global healthcare systems. Due to the chronic nature of this disease, the patient must understand self-management techniques that can help reduce other adverse effects in the body and enhance treatment outcomes. Intrinsic to this self-management is patient education. It educates patients on the dos and don'ts that are essential in the management of such diseases and the prevention of their complications. Yet, a key question remains: Is the current patient education model effective enough to foster the skills and knowledge required for effective self-management in diabetes? Treatment of type 2 diabetes is complex and includes medication compliance, diet, exercise, blood glucose control, and understanding of complications. Patient education aims to equip individuals with the necessary knowledge and self-assurance to effectively manage these aspects of their lives [7]. A recent study in China has revealed that educated patients tend to follow doctors' advice with regard to medication, exercise, behavior modification including dietary habits, have better glycaemic control, fewer complications, and healthier lifestyles [8]. Patient education is especially relevant in limited-resource environments where diabetes has a considerable economic impact. However, managing diabetes is quite challenging, and this may pose a problem, especially for the newly diagnosed. Digital health technologies, especially continuous glucose monitoring devices, have demonstrated potential in enhancing quality of life and promoting collaborative decision-making between patients and healthcare providers [9]. These instruments can assist in tackling significant difficulties in diabetes management, such as the burdens on patients and providers, insufficient data for informed decision-making, and inadequate access to care [10]. The incorporation of patient-centered techniques, including shared decision-making and multidisciplinary team cooperation, into diabetes care models can facilitate the attainment of glycaemic goals and enhance patients' quality of life [11]. Barriers to adoption encompass cost, coverage, and insufficient time for healthcare professionals [9]. Digital literacy skills, persistent connectivity, and anxiety around the loss of human relationships with providers also impede adoption [12]. Healthcare systems frequently offer insufficient training and resources for the optimisation of health information technology utilisation [12]. Moreover, structural obstacles continue to exist at both the provider and individual levels, despite increasing evidence supporting the advantages of newer technology [13]. Even with the availability of information through healthcare practitioners, the internet, and diabetes education programs, most patients are short on ideas on how to put the information into practice for everyday use. This implies that patient education models, despite providing valuable information, are not effectively enhancing the patient's ability or achieving the desired change in attitude and practice for self-management [14]. Effective strategies to surmount these obstacles encompass reducing expenses, streamlining tools, integrating with electronic health records, fostering collaborative connections with healthcare providers, sustaining an optimistic outlook, and establishing support systems [9]. To mitigate health disparities, it is essential to expand access to digital health technologies for marginalised communities [15].

The current patient education models frequently involve educating patients on diabetes, its treatment, and the need to embrace lifestyle changes. These include self-management education, which empowers patients to manage their condition by checking their blood glucose levels, selecting their meals, and exercising. Shadan et al. [16] recently conducted a randomised controlled trial to assess the efficacy of an innovative educational board game, "Diabe-teach," in improving knowledge retention among medical students in comparison to traditional self-study techniques. The results show that the "Diabe-teach" board game is a useful way to teach complicated medical ideas, such as diabetes mellitus self-care, while also helping students remember what they've learnt and think critically about themselves. Some models also include behavioural or psychological interventions to increase independence in self-care and enhance quality of life [17]. Despite the helpfulness of such approaches, not all patients can benefit from them due to differences in their learning profiles, cultures, and personal situations. For example, people with a certain age, a low income, or poor health literacy can have difficulty understanding the information received. Furthermore, the concepts that dominate the idea of education include passing information from the teacher to the learner without emphasising behaviour change. Although understanding how to count carbohydrates or administer an insulin injection might be beneficial, we often overlook the psychological aspects of the disease. Diabetes is associated with stress, anxiety, and frustration, which in turn may limit the patient's involvement in the care process. Diabetes-related distress in people with Type 2 diabetes mellitus is frequently associated with treatment protocols, hypoglycemic episodes, chronic comorbidities, and familial support [18]. The lack of focus on these emotional factors makes it difficult for some education models to offer adequate support solutions [19]. Recent trends indicate that

integrating mobile applications, online courses, and telemedicine into patient care can serve as a valuable educational tool. These platforms can enable them to provide individualized learning and continuous feedback, and such flexibility means that patients can learn at their own convenience. However, not everyone has internet access or feels comfortable with technology, leaving a gap in care for populations that may benefit the most from technological advancements [20]. Thus, current education models have to consider different, more effective approaches to foster patient engagement and efficient self-management of type 2 diabetes. We need comprehensive systems that encompass not only medical approaches to diabetes care, but also psychological, emotional, and social aspects. Patient education should be patient-centered in terms of preference, literacy level, cultural factors, and material availability. For instance, the ADCES7 Self-Care Behaviours™ model offers a comprehensive framework for facilitating behaviour modification and enhancing clinical outcomes via person-centred collaboration [21]. Effective diabetes care models in low- and middle-income countries are characterised by teamwork, education, standardisation, resource optimisation, and technological innovation [22]. The Community Chronic Care Model enhances the conventional Chronic Care Model by integrating community engagement and participatory action to enhance diabetes outcomes and mitigate health disparities [23]. Such self-management practices require sustained support, reinforcement, and follow-up since people tend to revert to old habits. Mobile apps, websites or blogs, an online forum, social networking sites, or telemedicine all serve as modern tools to make patient education broader and more effective [20]. Secondly, the development of a mutual patient-provider partnership remains an outstanding issue that requires immediate attention. Models of shared decision-making and/or involving the patient in the process, rather than placing all authority in the hands of the healthcare professional, can elicit a more positive response and compliance. Consistent education, repeated information, and follow-up encouragement rather than one-time education sessions seem to adequately prepare and equip the patients for an entire disease management process [24].

This commentary underscores the critical role of patient education in the self-management of Type 2 diabetes mellitus. While existing education models have contributed significantly to equipping patients with essential knowledge, they often fall short in fostering sustainable behavioral change and addressing the psychological, cultural, and technological challenges faced by diverse patient populations. The integration of modern tools such as digital health technologies and shared decision-making approaches into patient education frameworks presents promising opportunities to enhance patient engagement and improve glycaemic control. For healthcare providers, the findings emphasize the need to adopt patient-centered approaches that prioritize continuous education, mutual decision-making, and sustained support systems. By fostering a holistic understanding of diabetes management, providers can empower patients to take an active role in their care, ultimately improving outcomes and quality of life.

To address the gaps in current models, future research should focus on:

- i. Developing culturally and contextually sensitive education programs tailored to patients' literacy levels and technological accessibility.
- ii. Exploring the long-term impacts of innovative tools like gamified learning platforms and telemedicine on self-care practices.
- iii. Examining the psychological aspects of diabetes care, such as stress and anxiety, and incorporating mental health support into education frameworks.

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Declarations

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